RISK-BASED STANDARDS FOR KANSAS (RSK) AND DETERMINING SITE-SPECIFIC CLEANUP OBJECTIVES

Risk-based Standards for Kansas

KDHE published the first Risk-based Standards (RSK) Manual on March 24, 1999. Work on development of the RSK guidance was initiated for the Voluntary Cleanup and Property Redevelopment Program (VCPRP) in response to K.S.A. 65-34,167, which provides for the development of risk-based cleanup standards, and K.A.R. 28-71-11, the regulation that establishes the tiered-approach framework for developing the actual risk-based cleanup objectives. After developing the RSK guidance for the VCPRP, the concept was adopted for the entire Bureau of Environmental Remediation and the RSK Manual was intended to apply Bureau-wide, accordingly. The RSK Manual was included as Section 14 in the first VCPRP Manual; however, because the RSK manual will need to be modified more often than the VCPRP Manual, the current VCPRP Manual does not contain a version of the RSK Manual. The most recent version of the RSK Manual (at any given time) can be accessed via the internet on KDHE's Remedial Section web page (http://www.kdhe.state.ks.us/remedial/rsk_manual_page.htm).

The RSK guidance establishes a tiered-approach process for determining cleanup objectives at a property and is intended only for use on projects being conducted with KDHE oversight. The tiers include: Tier 1, establishing background concentrations for contaminants (primarily naturally occurring contaminants such as inorganic compounds and metals) and comparing site-specific contaminant values to background; Tier 2, using RSK-derived "off-the-shelf" values for comparison to contaminant concentrations; and, Tier 3, a more open-ended category to allow for alternative methods of calculating site-specific cleanup objectives when appropriate. The RSK guidance is designed for development of site-specific cleanup objectives for residential and non-residential land use settings. Plausible exposure pathways are considered including exposures to contamination in surface soil, consumption of contaminated ground water, and the "soil to groundwater pathway" which addresses the potential migration of contamination to ground water. The RSK Manual provides detailed a explanation of how the guidance has been developed and how it can be used.

Based on accumulated experience with application of the RSK guidance to VCPRP projects, the following issues are noteworthy:

- Appendix A of the RSK Manual presents tabulated Tier 2 cleanup objectives for over 170 of the more common contaminants that were calculated based on the RSK process. The fact that an identified contaminant at a property is not included in the Tier 2 Table does not imply that the contaminant is not of concern. The list of Tier 2 values is provided for convenience and is not totally inclusive of all contaminants to be regulated. The actual guidance is the **procedure** for calculating cleanup objectives which is followed for not-so-common contaminants if the necessary data (e.g., toxicity data, physico-chemical data, etc.) is available. The VCPRP has and will continue to calculate Tier 2 values for contaminants not yet included in Appendix A.

- Tier 2 values are cleanup objectives, not delineation targets. For additional discussion of what this means, refer to Voluntary Cleanup Investigation (VCI) Miscellaneous Information, Delineation of Contamination, located in Section 9 of this manual.

- The VCPRP generally uses the Tier 2 Residential values for decision-making purposes following completion of investigation activities. For example, following a VCI, if no contamination is identified in excess of Tier 2 residential values, the property may receive a No Further Action Determination as opposed to progressing to cleanup or monitoring.

- When considering application of Tier 2 values, it must be kept in mind that Tier 2 values are compound specific and do not consider cumulative risk from multiple contaminants present.

- RSK guidance does not currently address vapor intrusion/indoor air exposure pathways; however, the department is currently developing guidance that will be included in future versions of the RSK Manual.

- Most programs within the Bureau of Environmental Remediation have adopted the Tier 2 values as default cleanup objectives; however, options for calculating site-specific cleanup objectives under Tier 3 can vary from program to program. For the VCPRP, the Tier 3 process cannot include conducting a baseline risk assessment as might be allowed for other programs. The Tier 3 process for the VCPRP can include using RSK guidance to calculate pathway-specific cleanup objectives by substituting site-specific parameters for default values as identified in the RSK Manual. The VCPRP Tier 3 can also include methods to assist in determining cleanup objectives such as modeling, and other unique approaches as approved on a project-specific basis by the VCPRP.

Determination of Cleanup Objectives

The RSK guidance establishes the procedure for developing site-specific risk-based cleanup objectives in terms of contaminant concentrations in specific media for various land use settings. For properties that must progress to the cleanup phase based on identified contamination, many other factors and options exist that should be considered in developing cleanup alternatives; i.e., the cleanup objectives are the targeted contaminant concentrations to be achieved through cleanup to receive a No Further Action determination while the cleanup alternatives are the strategies to achieve the objectives. The cleanup objectives should be established prior to, and as a basis for, developing cleanup alternatives which would typically take place during the preparation of a Voluntary Cleanup Proposal (see Section 13).

The voluntary party will have numerous options available in terms of cleanup strategies that can be approved by KDHE and that will result in a No Further Action (NFA) determination for a property. It should not be interpreted that every VCPRP project will require removal or treatment of impacted media until RSK values are achieved, as complete cleanup is not always technically and economically

feasible. As new guidance and policy are developed, the types of cleanup approaches that may be approved by KDHE may change.

For example, in Kansas, the default assumption is that any ground water encountered beneath a property is potable and deserves the ultimate protection; RSK Tier 2 ground water values are applicable and cannot be modified if the Tier 2 value is based on a Maximum Contaminant Level (MCL). Considering that there are areas in Kansas where ground water is not potable because of elevated levels of naturally occurring inorganic constituents and, in other areas shallow, perched ground water may be present but has not and would likely not be capable of delivering sustainable yield to wells, applying ground water standards based on MCLs or even considering applying ground water pathway RSK values may be overly conservative. In May 2004, the Bureau of Environmental Remediation developed the policy, BER-RS-045, to define conditions where it would be allowable to eliminate application of RSK ground water pathways based on naturally poor quality or extremely low yield to wells.

Another significant event that affects development of cleanup alternatives is the Environmental Use Control (EUC) legislation that became effective July 1, 2003. EUCs are essentially institutional controls that were already allowed to be included as components of cleanup alternatives in accordance with VCPRP regulation. The EUC legislation affects cleanup considerations in that if contamination in excess of unrestricted use levels (RSK Tier 2 **residential** levels) is to be left in place or allowed to remain on a property, an EUC would need to be applied to the property before the property could receive an NFA. Alternatively, EUCs can facilitate conditional NFAs as they can include long term monitoring provisions that could allow an NFA to be provided for a property earlier, allowing the longer term, extended frequency monitoring to be performed as part of the EUC. EUCs are discussed in more detail in Section 19.

Again, there are usually several cleanup alternatives for a given contamination scenario that could be accepted by the VCPRP. When a property is to proceed into cleanup, it would behoove the voluntary party to communicate with the VCPRP project manager and clearly identify options that could be supported by the VCPRP.